

type, a green male, in the Museum of Comparative Zoölogy at Cambridge; a male in each of the collections of Mr. Blanchard, Tyngsboro, Mass., Prof. Fall, Pasadena, Cal., and Mr. Gustave Chagnon, Montreal, Can.; the three remaining males and the female are in my collection.

ON CHRYSOBOTHRIS CALIFORNICA AND ALLIES.

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In my List of the Coleoptera of Southern California reference is made to the taking in the San Bernardino Mts. of a specimen of *Chrysobothris californica* from its burrow in the dead twigs of *Pinus ponderosa*. The identification was based on Horn's table and description and seemed satisfactory. A little later a second specimen taken in the same region was identified for me by an eastern specialist as *californica*. The two specimens looked much alike, and the identification was accepted without question. From time to time other specimens were added to my series, until it began to take on a somewhat mixed appearance, and a recent critical examination has convinced me that no less than three distinct species were involved. To determine which was the real *californica* comparison was made this past summer with the LeConte type at Cambridge. Imagine my surprise at finding that neither one of the three was identical with the type. One of my species proved to be *caurina* Horn (not quite typical however), while the other two were new and will be described in the present paper.

Further investigation among the allied species revealed a condition of affairs wholly unexpected. Notwithstanding the deliberate and painstaking work of Horn in his treatment of this genus, errors of such a nature exist in the table and descriptions of certain species in this part of Group IV as to make it quite impossible for the student correctly to identify his material thereby. Three species are involved in these errors, which are briefly as follows:

Californica.

This is placed in the group with lobed prosternum. The prosternum is really completely devoid of any trace of a lobe. The form of the apical dilatation of the front tibia of the male is also incorrectly described. The species described by Horn as *californica* is—in these two respects at least—the *monticola* of the present paper.

Caurina.

Placed by Horn in the group with prosternum not lobed. There is an evident lobe in all specimens examined by me, including examples from the type series kindly sent me for study by Dr. Skinner.

Carinipennis.

The anterior tibiæ of the male are said to be deeply sinuate at the base of the dilatation. The type shows no such sinuation. These are fundamental characters, and if misapplied the situation cannot be saved by any amount of fidelity as to other details. The species *trinervia* to *californica* of Group IV are therefore retabulated below, and with them are included four new species which fall within the same limits. In interpreting the form of the prosternum the faintest possible arcuation of the anterior margin is not to be considered a lobe, but anything suggestive of a lobiform prominence, no matter how short, is to be thus construed. A small amount of individual variation in this particular has been observed, but with some experience, especially if several examples are at hand, there should be no great difficulty in deciding to which group a given specimen belongs.

KEY TO SPECIES TRINERVIA—CALIFORNICA OF HORN'S GROUP IV.

- A. Prosternum not lobed in front, the anterior margin at most very broadly and feebly arcuate at middle; anterior tibiæ of male not or but slightly sinuate above the apical dilatation.
 - B. Tibial dilatation of male narrow and long, one third the length of the tibia; eyes widely separated above; body beneath bronzed, size larger (about 17 mm.)*californica* Lec.
 - BB. Tibial dilatation evidently less, usually much less than one third the length of the tibia; eyes less widely separated above, always by a distance which is distinctly less than half their vertical length; size smaller (rarely as much as 14 mm.).
 - C. Antennæ with joints 4-11 in part testaceous; apical dilatation of front tibia of male dentiform*verdigrispennis* Frost.
 - CC. Antennæ entirely dark, usually with metallic lustre throughout.

- D. Prosternum sparsely pubescent, not densely punctate in either sex; tibial dilatation rather narrow; under surface typically green*carinipennis* Lec.
- DD. Prosternum densely punctate and rather densely pubescent in the male; tibial dilatation shorter and broader.
- E. Prothorax more abruptly narrowed in front than behind; sculptured areas of elytra not very densely punctate, smooth spaces narrower, body bronzed beneath.
trinervia, Kby.
- EE. Prothorax as abruptly or even more abruptly narrowed behind than in front; punctured spaces of elytra very densely punctate and dull, smooth areas broader; body beneath bright green in the male, blackish green in the female.*sylvania* n. sp.
- AA. Prosternum with a short broad lobe in front.
- F. Tibial dilatation rather abruptly narrowed before the apex; emargination of last ventral of female limited at bottom by a thin slightly projecting and deflexed plate; prosternal lobe very short.
caurina Horn.
- FF. Tibial dilatation of male not abruptly narrowed before the apex; last ventral of female without apical plate.
- G. Tibial dilatation of male short and broad, a little sinuate on its inner margin, the apical angle mucronate, tibia deeply sinuate at base of dilatation; prosternal lobe very short.*breviloba* n. sp.
- GG. Tibial dilatation rather strongly arcuate internally, the tibia a little narrowed at base of dilatation, but not evidently sinuate; prosternal lobe stronger.....*monticola* n. sp.

C. californica Lec.

Seven specimens are placed over this label in the LeConte collection, the series standing precisely as left by Horn, who worked over the material while preparing his monograph of the genus. The first in line and bearing the name label is unquestionably the original type of LeConte. It is a male, 17 mm. in length, sculpture cupreous, beneath also coppery, eyes separated above by somewhat more than half their vertical length; prothorax widest just before the base, sides converging a little in front and sinuate at middle, dorsal channel deep with broad smooth callosity each side reaching from the apex three-fourths to the base; elytral sculpture of the same type as in related species, very densely punctate, smooth spaces not strongly elevated, sutural costa entire; prosternum without the faintest indication of a lobe in front, dilatation of front tibia unusually long and narrow, one-third the length of the tibia, which is not at all sinuate

at the base of the dilatation; pygidium coarsely punctate, subcribrate near the edge, which is irregular from the coarseness of the sculpture. The clypeal emargination is quite deep and of a form somewhat suggestive of that of *femorata*. The second and third specimens in the LeConte series are females, similar in size (one even larger) and appearance to the male type and probably identical with it. In one of them the eyes are as widely separated as in the type, in the other rather less so; the clypeal emargination also shows less approach to the *femorata* type. They are labeled simply "Cal." The fourth specimen is the type of *vulcanica* Lec. which Horn suppresses as a small form of *californica*. It is evident that in making this statement Horn had in mind the large size of typical *californica*, but as the length of *vulcanica* is 15 or 16 mm. and the measurements given by him for *californica* are 10-19 mm., the force of the remark is not

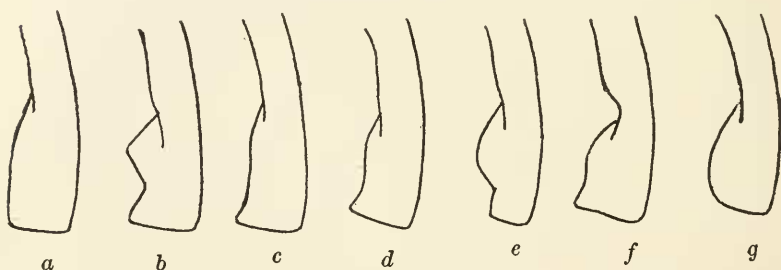


FIG. 1. Outline drawings of apex of fore tibia of the following species of *Chrysobothris*; a, *californica*; b, *verdigripennis*; c, *carinipennis*; d, *trinervia* and *sylvania*; e, *caurina*; f, *breviloba*; g, *monticola*.

apparent. It is by no means certain that *vulcanica* is the same as *californica*, but it must go as placed until males have been properly associated. The type is a female without antennæ or front legs; it resembles *californica* considerably but the prothorax is more densely rugosely sculptured, the smooth spaces each side of the median groove are encroached upon by the punctures and are therefore small and not very well defined; the sutural costa of the elytra is obsolete in fully basal half and the other costæ are even more undeveloped. The eyes are a little less distant than in *californica*, the prosternal margin not lobed, though faintly more prominent at middle. The last ventral is rounded at apex without trace of an emargination, probably an accidental variation. The specimen is from Oregon.

The fifth example in line is also from Oregon, is a female, and looks a good deal like *vulcanica*, which it probably is; it has the last ventral with a narrow and small but rather deep emargination.

The sixth specimen is a female with lobed prosternum, identity doubtful, certainly not *californica*, and the seventh is a male *caurina*, or a species so close to *caurina* that we are unable at present to separate them.

Since returning to California there has turned up in a small series of specimens sent me by Dr. Van Dyke two examples of genuine *californica*, both females, and a third specimen—also a female—has been sent by Dr. Blaisdell. Dr. Van Dyke's specimens are from Independence Lake, Nevada Co., California, at an altitude of 7,000 ft.; and Dr. Blaisdell's comes from Shasta Co. Dr LeConte's type was obtained from Murray, but neither it nor his other specimens bear any more definite locality label than "California."

C. verdigripennis Frost.

The discovery in New England at this late day of a new *Chrysobothris*, and one of the very finest of the group to which it belongs, is as interesting as it is surprising. Its detection is due to Mr. Frederick Blanchard, who having seen males taken by Mr. Frost, recognized a female in his own collection, and later found two or three specimens in the Cambridge collections mixed with other species. Mr. Frost's description (on a preceding page of this issue) is well drawn up and leaves very little to be said by way of characterization. The partly testaceous antennæ will at once distinguish it from everything except *dentipes*, with which it would be associated by Horn's table. In the latter species the apical dilatation of the male front tibia is quite different, the elytral punctuation denser and the prosternum is very sparsely punctate in both sexes; *verdigripennis* however seems to me less closely allied to *dentipes* than to *trinervia* and the neighboring species, and I have therefore included it in the preceding table.

C. carinipennis Lec.

The dilatation of the anterior male tibia in this species is longer and narrower than in any other allied form except *californica*, and comprises fully one-fourth the total length of the tibia. There is no appreciable sinuation at the base of the dilatation in the type, and

allowing for a moderate amount of individual variation it is probable that the tibia is never deeply sinuate, as it is described to be by Horn, who, I think, must have mixed individuals of two species. The prosternum of the male is sparsely punctate or nearly smooth along the middle, a rare character in this group and one that does not obtain in any of the other species here tabulated. Typical *carinipennis* is bright green beneath, and it is by no means certain that the specimens with under side bronzed or coppery are identical; these should receive further study.

C. sylvania, new species.

Closely allied to *trinervia*, but rather broader and heavier, the color beneath bright green in the male, dark green with cupreous reflections in the female; prothorax as abruptly or even more abruptly narrowed behind than in front; elytral costæ not as distinctly elevated as in typical *trinervia*, the smooth spaces sharply defined, the punctured areas more densely punctate than in *trinervia*; sexual characters as in *trinervia*. Length 11.5-11.8 mm.; width 5-5.1 mm.

Described from two males and two females collected by Mr. L. E. Ricksecker at Sylvania, California. Two of the four specimens differ a little from the type pair but are probably identical.

C. caurina Horn.

The form of the apical dilatation of the front tibia of the male, and of the apex of the last ventral of the female are peculiar to this species. This last does not seem to me to be very aptly described by Horn, who says in his table that there is "a well-marked transverse ridge in front of the notch." This apical ridge or carina consists of the free edge of the terminal portion of the submarginal serrate ridge, which is feebly developed laterally, leaving the apical portion where it cuts across the bottom of the emargination, smoothly outlined and a little deflexed, and is best seen when looked at from behind and nearly in the axial line of the body.

There are in the collection of Dr. Fenyes and myself some fifteen examples which I refer to *caurina*, as the sexual characters are virtually identical, yet not one of them is exactly like the typical examples sent me for examination by Dr. Skinner. Further study with sufficient material may show that our aggregate under this name is composite.

C. breviloba, new species.

Similar in form, size, sculpture and color of upper surface to *carinipennis*, from which it differs most essentially in the modification of the anterior tibiae in the male. The apical dilatation is here as wide as long, constituting about one fifth the length of the tibia, which is typically deeply sinuate above the dilatation. The color of the under surface is dark bronze or cupreous, with at most faint greenish reflections along the ventral sutures; prosternum with a faint incipient lobe in front, densely punctate and hairy in the male, more sparsely punctate, more convex and less hairy in the female as usual. The smooth areas of the prothorax are well defined, those of the elytra numerous but not large, well defined and contrasting sharply with the densely punctate areas; the pygidium is moderately closely punctate in the male, densely so in the female. In *carinipennis* the color beneath is typically brilliant green throughout, but is bronzed in some examples (unless perchance these are representatives of a closely allied species which we have not yet been able to separate), the prosternum is not evidently lobed, thinly hairy, and sparsely punctate or smooth along the median line, even in the male, a quite unusual character; the smooth areas of the upper surface are everywhere smaller or less sharply defined, the pygidium rather finely and quite sparsely punctate in the male, more closely so in the female. In the series of *breviloba* at hand the length varies from 9.8 to 12 mm.; width from 4 to 4.8 mm.

As compared with *monticola*, *breviloba* is a distinctly smaller species, the eyes less approximate on the vertex, their distance apart being evidently greater than the maximum width of the eye, and about equal to half their distance apart at the middle of the front; the smooth areas of the elytra relatively numerous (only about five or six in number on the disk in *monticola*), the sutural interval with alternating smooth and punctured spaces (punctate throughout or nearly so in *monticola*), prosternum less evidently lobed in front; dilatation of both front and middle tibiae of different form.

The series of *breviloba* before me comprises six males and four females, all from Colorado (Glenwood Springs, Buena Vista, Boulder, Florissant, Cañon City).

In a few males the sinuation of the front tibia is less deep than in the typical form, the *dilatation* however being of the same shape; these may possibly prove distinct, but I am unable to characterize them distinctly with the few specimens at hand.

C. monticola, new species.

Moderately elongate, subdepressed, black, punctured areas cupreous, beneath bronzed or cupreous, lateral callosities of abdomen purplish. Antennae more slender externally, greenish or cupreous in the male, darker

bronzed, becoming blackish apically in the female, third joint barely as long as the next two. Front densely punctate with two callosities which are larger in the female, flat and cupreous or greenish in the male, more convex and darker bronzed in the female. Eyes rather narrowly separated at summit, their minimum distance apart about two fifths the length of their inner side and subequal to their median width. Clypeus triangularly emarginate, the notch somewhat rounded at bottom. Prothorax nearly twice as wide as long, narrowed at apex and base, sides at middle nearly straight and parallel for a greater or less distance; median line sulcate, densely punctate in apical two thirds, smooth at base, a very narrow smooth line extending forward a variable distance; groove limited each side by a broad feebly elevated space, which is smooth in front; exterior to this two more or less connected and irregular callosities; surface elsewhere densely punctured. Elytra wider than the thorax, very nearly twice as long as wide, first costa entire, becoming broader at base, the sutural interval punctate throughout; second and third costæ interrupted; punctured areas densely punctate, smooth areas not very numerous and rather large. Prosternum lobed in front, densely punctate in both sexes; abdomen sparsely punctate; anterior femur with moderate tooth, which is serrulate externally; last ventral with more or less evident submarginal ridge, the lateral margin serrulate. Length 11-15 mm.; width 4.5-6.5 mm.

Male.—Prosternum flatter, more hairy and a little more finely punctate. Anterior tibia curved, apical dilatation barely one fourth the length of the tibia and arcuate in outline, the tibia slightly narrow at the base of the dilatation but not obviously sinuate; middle tibia feebly arcuate beyond the middle, gradually broader at apex; last ventral segment deeply semicircularly emarginate; last dorsal with a moderately broad median notch.

Female.—Prosternum less flat, less hairy, and usually more coarsely and a little less densely punctate; tibiae unmodified, last ventral with a small apical emargination, last dorsal more densely punctate and with a smaller narrow median notch.

Described from six males and four females in Dr. Fenyès' and my own collection. It occurs on pines in the California Sierras, about Lake Tahoe and in the San Bernardino and San Jacinto Mts.

As I have pointed out previously, this species is the one which best fits Dr. Horn's description of *californica*, and I might about as well have referred to that description and saved myself the trouble of writing a new one, but for the desirability of having here a complete description for comparative purposes. The true *californica* differs distinctly in its nonlobed prosternum, narrower and longer tibial dilatation, and more widely separated eyes.

The form of the prothorax is somewhat variable in *monticola*, as it is in most if not all of the allied species; it is usually as above described, but in some specimens the sides are nearly straight and convergent from the post-apical dilatation to the base.